

Inter-American Materials Collaboration: Large Scale Synthesis of N-doped Carbon Nanotubes for the Fabrication of Novel Polymer Composites and Related Low Dimensional Materials

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International collaboration and outreach

The primary aim of the program is to foster long-term collaboration between the RPI and IPICyT (Prof. Mauricio Terrones) research groups. This collaborative effort involved setting up facilities for synthesis of various kinds of carbon nanostructures (pure as well as doped nanotubes) and the evaluation of their properties. Several visiting graduate and undergraduate students (Ana Laura Elias Arriega, Felipe Cervantes and Juan Jose Villateja) from IPICyT worked on the modification and characterization of these nanotube structures. The excellent exchange program that has resulted from the program has greatly benefited the Mexican students and has strengthened the collaboration between the two institutions.

An International conference on the science and application of carbon nanotubes (NT-04, held in San Luis Potosi, Mexico from July 18-23)) was co-organized by the PI and the Mexican collaborators

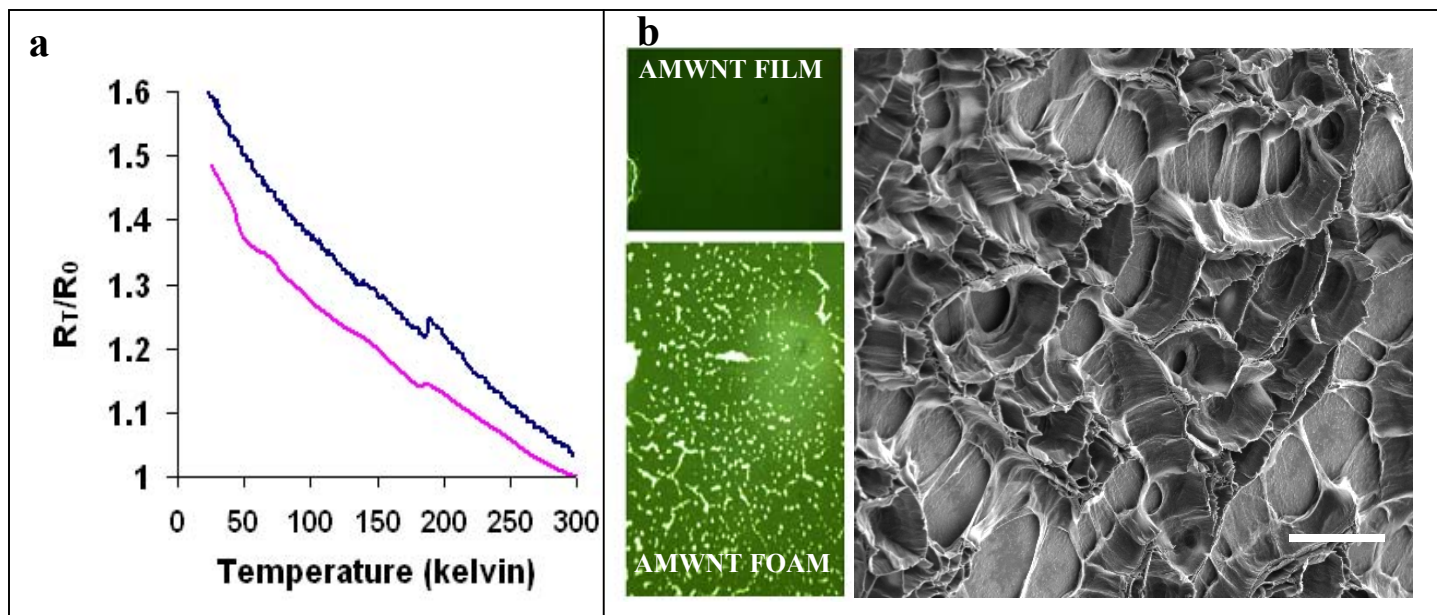
Research projects

- Tuning the electronic properties of multiwalled carbon nanotube films by creating self-organized patterns
- Doping induced modification of properties of carbon nanotubes
- Electro-spinning of polymer fibers with embedded carbon nanotubes
- Electrowetting of aligned carbon nanotube membranes
- Polymer adsorption in 1D nanochannels

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Research highlight: Low temperature electrical transport measurement of carbon nanotube foams made from aligned multiwalled nanotubes films (AMWNT) were performed. These foams were obtained by evaporating various organic solvents from the AMWNT film surface. Electrical measurements done on continuous nanotube films and foams showed that conductivity of these films can be tailored by controlled patterning post-synthesis processes.



a) Ratio of the resistance (y-axis) at temperature T (R_T) with room temperature resistance (R_0) plotted against Temperature (x-axis). The top curve is for continuous film and the bottom curve is for the patterned film. **b)** (left panel) shows optical images of the film before (top) and after (bottom) forming patterns. (right) SEM image of the nanotube foam (Scale bar equals 50 μm).